

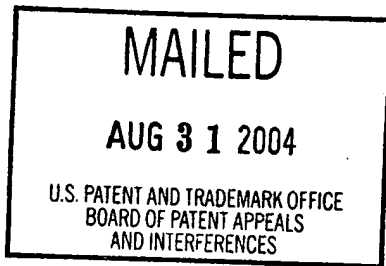
The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

Paper No. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

*Ex parte* STEVEN LUO,  
KOJI MASAKI and TATSURO HAMADA



Appeal No. 2004-1898  
Application 09/923,983

ON BRIEF

Before WARREN, WALTZ and TIMM, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

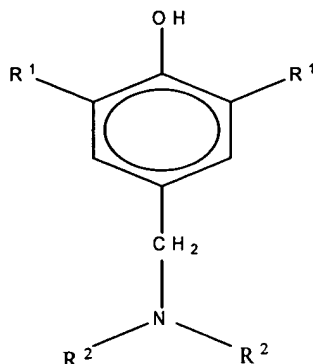
*Decision on Appeal*

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1, 2, 4, 5, 21 and 22. While the examiner has withdrawn the ground of rejection with respect to claims 21 and 22, allowing these claims in substance (answer, pager 2), pursuant to our authority under 37 CFR § 1.196(b) (2003), we have considered these claims. Claims 6 through 10 and 12 through 19 are also of record and have been withdrawn from consideration by the examiner under 37 CFR § 1.142(b).

Claim 1 is illustrative of the claims on appeal:

1. A stabilized syndiotactic 1,2-polybutadiene composition comprising:  
a syndiotactic 1,2-polybutadiene, and

an antioxidant defined by the formula



where each of R<sup>1</sup> and R<sup>2</sup>, which may be the same or different, are mono-valent organic groups, or where each R<sup>1</sup>, which may be the same or different, is a mono-valent organic group and the two R<sup>2</sup> groups join to form a divalent organic group.

The appealed claims, as represented by the above claim, are drawn to a stabilized syndiotactic 1,2-polybutadiene composition comprising at least a syndiotactic 1,2-polybutadiene and at least some amount of a 2,6-di(organic group)-4-(di(organic group)aminomethyl) phenol of the depicted structural formula, which is characterized as an antioxidant. Claims 2, 21 and 22 specify certain amounts of the phenol per 100 parts of the syndiotactic 1,2-polybutadiene. According to appellants, the stabilized compositions are useful in the manufacture of tires (specification, e.g., page 11).

The references relied on by the examiner are:

Kline	3,935,160	Jan. 27, 1976
Luo	6,117,956	Sep. 12, 2000

The examiner has rejected appealed claims 1, 2, 4 and 5 under 35 U.S.C. § 103(a) as being unpatentable over Kline in view of Luo.

Appellants state that appealed “[c]laims 4 and 5 . . . stand or fall with claim 1” and that appealed claim 2 is separately patentable (brief, page 4). Thus, with respect to the above ground of rejection, we decide this appeal based on appealed claims 1 and 2.<sup>1</sup> 37 CFR § 1.192(c)(7) (2003).

<sup>1</sup> Appellants also takes issue with the examiner’s requirement for restriction (brief, pages 3, 4 and 14). This matter is petitionable and is not before us. 37 CFR §§ 1.143 and 1.144 (2003). See *In re Watkinson*, 900 F.2d 230, 233, 14 USPQ2d 1407, 1409-10 (Fed. Cir. 1990); *In re Hengehold*, 440 F.2d 1395, 1404, 169 USPQ 473, 479 (CCPA 1971).

We affirm the ground of rejection advanced on appeal by the examiner and accordingly, the decision of the examiner. Under the provisions of 37 CFR § 1.196(b) (2003), we enter a new ground of rejection of claims 21 and 22 under 35 U.S.C. § 103 as being unpatentable over the combined teachings of Kline and Luo. *See generally, In re Eynde*, 480 F.2d 1364, 1370-71, 178 USPQ 470, 474-75 (CCPA 1973); Manual of Patent Examining Procedure § 1213.02 (8th ed., Rev. 2, May 2004; 1200-32).

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the answer and to the brief for a complete exposition thereof.

### *Opinion*

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the supported position advanced by the examiner (answer, pages 4-5) that, *prima facie*, one of ordinary skill in this art would have found in the combined teachings of Kline and Luo the suggestion that the 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol compounds disclosed by Kline can be used in compositions containing a syndiotactic 1,2-polybutadiene as disclosed by Luo with the reasonable expectation of preventing oxidative degradation arising from transition metal residue in the syndiotactic 1,2-polybutadiene composition. We add the following to the examiner's analysis, and include our consideration of claims 21 and 22.

We find that when the claim terms are given their broadest reasonable interpretation in light of the written description in the specification as it would be interpreted by one of ordinary skill in this art, *see, e.g., In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989), the plain language of appealed independent claim 1, on which the appealed claim 2 and claims 21 and 22 depend, specifies a stabilized syndiotactic 1,2-polybutadiene composition comprising at least some amount, however small, of said polybutadiene and some amount, however small, of a 2,6-di(organic group)-4-(di(organic group)aminomethyl) phenol compound of the depicted structural formula that can be characterized as having antioxidant properties. The transitional term "comprising" opens the claim to include any manner of additional ingredients, including additional antioxidants and other stabilizing compounds, in any amounts. *See generally,*

*Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555, 35 USPQ2d 1801, 1802 (Fed. Cir. 1995) (“The claimed composition is defined as comprising - meaning containing at least - five specific ingredients.”); *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”).

Indeed, appellants disclose in the written description in the specification that an additional antioxidant can be used in the composition (page 10, lines 7-10), and there is no limitation in appealed claim 1 requiring that the stability of the “stabilized” composition must be entirely due to the presence of a 2,6-di(organic group)-4-(di(organic group)aminomethyl) phenol compound falling within the structural formula that can be characterized as having antioxidant properties. We point out in this respect, that the limitations on the amount of the 2,6-di(organic group)-4-(di(organic group)aminomethyl) phenol in appealed claim 2 and claims 21 and 22 are not specified to confer “stability.” Indeed, there is also no limitation in any claim on the degrading and deleterious condition(s) against which the composition is “stabilized” or the extent to which the composition must be “stabilized” against any and all such condition(s).

In appealed claim 1, the specified phenol derivatives have a “mono-valent organic group” in the “R<sup>1</sup>” or 2,6- positions, that is, the *ortho* positions, relative to the phenolic hydroxy group, which can be the same or different “organic groups.” The substituents “R<sup>2</sup>” on the amino nitrogen of the aminomethyl group in the 4- position, that is, the *para* position, can either be the same or different “mono-valent organic groups” or “join” together as a “divalent organic group” which thus forms a heterocyclic moiety with the amino nitrogen as one of the ring members.

Ordinarily, the term “organic group” is well recognized in the organic chemistry arts as meaning *any* manner of group or substituent that can be characterized as “organic.” We are of the opinion that one of ordinary skill in this art would understand from pages 5-8 of appellants’ specification that the use of this term in the claims carries the breadth associated therewith in the art, whether “mono-valent” or “di-valent.” Indeed, we find no basis in either the language of appealed claim 1 or in the written description in the specification to limit the compounds encompassed by the depicted structural formula to those phenol derivatives having

a di-*t*-butyl, that is, di-tertiary butyl, or other alkyl group in the 2,6- positions, and/or di-alkyl or di-methyl substituents on the aminomethyl group in the 4- position. *See Morris, supra; Zletz, supra* (“During patent prosecution the pending claims must be interpreted as broadly as their terms reasonably allow. When the applicant states the meaning that the claim terms are intended to have, the claims are examined with that meaning, in order to achieve a complete exploration of the applicant’s invention and its relation to the prior art. *See In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).”); *In re Priest*, 582 F.2d 33, 37, 199 USPQ 11, 15 (CCPA 1978).

There is no limitation in appealed claim 1 with respect to the properties of “a syndiotactic 1,2-polybutadiene.” Indeed, appellants state in the written description in the specification that the same is “typically synthesized by polymerizing 1,3-butadiene in the presence of a coordination catalyst system,” wherein “[m]any polymerization techniques and catalyst systems are known for this polymerization, and the practice of this invention is not limited by the selection of a high-vinyl polybutadiene polymer that has been polymerized by any particular catalyst system or method of polymerization” (page 8, line 26, to page 9, line 2). Appellants acknowledge that “it is generally known that syndiotactic 1,2-polybutadiene can be prepared by using a variety of coordination catalyst systems,” including cobalt-, iron-, molybdenum- and chromium-based catalyst systems (*id.*, page 9, lines 3-9).

Comparing the claimed compositions encompassed by appealed claims 1 and 2 as we have interpreted these claims above with teachings of Kline and Luo, we find that Kline would have taught one of ordinary skill in the art that the (disubstituted aminomethyl) phenol derivatives disclosed therein can be used in compositions of “stereoregular polymers” which are diene polymers “prepared using transition metal containing catalysts” from, *inter alia*, 1,3-butadiene, using, *inter alia*, titanium- and cobalt-containing catalyst systems, in order to deactivate residues of the transition metal catalysts which are known to cause “severe stabilization problems, i.e., tend to accelerate the oxidative degradation of the polymer,” (e.g., col. 1, lines 8-41, and col. 2, line 45, to col. 3, line 43). This person would have known that

stereoregular diene polymers include syndiotactic diene polymers.<sup>2</sup>

The (disubstituted aminomethyl) phenol derivatives have the structural formula depicted at col. 1, lines 44-52, wherein R and R<sup>1</sup> are hydrogen or mono-valent alkyl groups of 1 to 8 carbon atoms, and R<sup>2</sup> and R<sup>3</sup> are individually mono-valent alkyl or hydroxyalkyl groups, or combined as a divalent radical that forms a heterocyclic moiety with the amino nitrogen as one of the ring members (e.g., col. 1, lines 53-64). The phenol derivatives can contain a total of 4 substituents in which case a disubstituted aminomethyl group is in the *para*- or 4- position relative to the hydroxy group on the ring, and the ring containing 1 or 2 additional di-substituted aminomethyl groups (e.g., col. 1, line 63, to col. 2, line 5). Thus, the Kline compounds include 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol derivatives.

Kline further would have disclosed that while “all [of these] compounds are metal deactivators, many are not very effective as antioxidants” (col. 3, lines 46-48). We find that one of ordinary skill in this art would have inferred from this disclosure that *all* of the (disubstituted aminomethyl) phenol derivatives have antioxidant properties at least to some extent.<sup>3</sup>

This disclosure is made in the context of the teaching that, *inter alia*, “[p]referably a hindered monohydric phenolic antioxidant” can be added along with disclosed (disubstituted aminomethyl) phenol derivatives (col. 3, lines 44-46). In this respect, Kline acknowledges and teaches that

[t]he phenolic stabilizers are well known as effective stabilizers for natural and conventional synthetic rubbers. Hindered phenolic antioxidants are those that have a bulky secondary or tertiary alkyl group attached to the phenolic ring in at least one of the positions ortho to the hydroxy group.

... The level of phenolic antioxidant can vary, but normally is added in the amount of 0.1 to 10 parts by weight of 100 parts by weight of polymer. A preferred range is from 0.5 to 1.5 parts by weight. Typical of the hindered monohydric phenolic antioxidants are the 2,6-dialkylated para cresols, such as 2,6-di[tertiary]butyl-p-cresol. ...

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<sup>2</sup> See “**polymer, stereospecific**” in *Hawley’s Condensed Chemical Dictionary* 902 (13th ed., Richard J. Lewis, Sr., ed., New York, Van Nostrand Reinhold Company, 1997).

<sup>3</sup> It is well settled that a reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in this art would have reasonably been expected to draw therefrom, see *In re Fritch*, 972 F.2d 1260, 1264-65, 23 USPQ2d 1780, 1782-83 (Fed. Cir. 1992); *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968), presuming skill on the part of this person. *In re Sovish*, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985).

If either the phenolic antioxidant or [(disubstituted aminomethyl) phenol derivative] compound is omitted, the resistance of the resulting polymer to oxidative degradation will be lowered. [Col. 3, lines 49-68.]

We note here that 2,6-di-tertiary butyl-p-cresol is also named 2,6-di-tertiary butyl-4-methyl-phenol.

Kline would have disclosed that the (disubstituted aminomethyl) phenol derivatives and the hindered monohydric phenolic antioxidants “should be added to the polymer solution . . . preferably as soon as the polymerization reaction is completed and necessarily before the polymer solution is exposed to air or subjected to any heating or drying operations,” and may be added as a mixture or separately (col. 4, lines 1-21). Kline would have taught one of ordinary skill in this art that the amount of the (disubstituted aminomethyl) phenol derivatives as well as the hindered monohydric phenolic antioxidant can be varied (e.g., col. 3, lines 57-61, and col. 4, lines 22-26), and the “stabilized polymers may be used according to any of their standard uses” such as “in the manufacture of tires” (e.g., col. 4, lines 27-31). In these respects, Kline illustrates mixtures of (disubstituted aminomethyl) phenol derivatives and the hindered monohydric phenolic antioxidant “2,6-ditert.hexyl-p-cresol,” that is, 2,6-di-tertiary hexyl-4-methyl phenol, with respect to oxidative degradation (col. 5, lines 14-50).

Kline discloses a number of species, several of which contain a tertiary butyl substituent in one or both positions *ortho* to the hydroxy group, that is the 2- and/or 6- positions, of the phenolic ring in addition to the disubstituted aminomethyl group in the *para*- or 4- position: “2,6-ditert.butyl-4-dimethylaminomethylphenol,” “2,4-bis(dimethylaminomethyl)-6-tert.butylphenol,” and “2,6-ditert.butyl-4-piperidinomethylphenol” (col. 2, lines 6-28).

We find that *all* of the (disubstituted aminomethyl) phenol derivatives disclosed by Kline which have a substituent in the 2,6- positions and a disubstituted aminomethyl group in the 4- position of the phenolic ring, that is, 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol derivatives, are encompassed by appealed claim 1 because such substituents are in fact “organic groups” and Kline in fact would have disclosed that these compounds have antioxidant properties at least to some extent.

Thus, in addition to the three compounds we listed above, two of which are cited by the examiner (answer, pages 4 and 8), the specific disclosed compounds encompassed by appealed

claim 1 also include “2,4,6-tris(dimethylaminomethyl) phenol,” “2,4,6-tris(diethylaminomethyl) phenol,” and “2,4,6-tris[bis(2-hydroxyethyl)aminomethyl] phenol” (col. 2, lines 6-28) as well as “2,4,6-trimorpholinomethylphenol” (col. 5, line 43). Kline illustrates a number of these derivatives in the mixtures shown in Table I (col. 5, lines 14-50).

We are of the opinion that Kline alone provides substantial evidence in support of the position that, *prima facie*, one of ordinary skill in this art routinely following this reference alone would have used any of the (disubstituted aminomethyl) phenol derivatives disclosed as transition metal catalyst deactivators having antioxidant properties therein, either alone or in combination with a hindered monohydric phenolic antioxidant, in the reasonable expectation of stabilizing a composition containing any stereoregular diene polymer prepared from 1,3-butadiene with a transition metal containing catalyst system with respect to oxidative degradation caused at least by the transition metal residue as taught by Kline, and thus would have reasonably used the (disubstituted aminomethyl) phenol derivatives alone or in combination with a hindered monohydric phenolic antioxidant in compositions containing syndiotactic 1,2-polybutadiene prepared with transition metal containing catalyst systems known in the art as acknowledged by appellants as we set forth above.<sup>4</sup> Indeed, one of ordinary skill in this art would have reasonably used any of the (disubstituted aminomethyl) phenol derivatives, including the 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol derivatives, in the reasonable expectation of arriving at a stabilized composition as disclosed in the reference. *See generally, Merck & Co., Inc. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1845-46 (Fed. Cir. 1989) (“That the ‘813 patent discloses a multitude of effective combinations does not render any particular formulation less obvious. This is especially true because the claimed composition is used for the identical purpose.”); *In re Susi*, 440 F.2d 442, 445,

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<sup>4</sup> *See In re Nomiya*, 509 F.2d 566, 570-71, 571 n.5, 184 USPQ 607, 611, 611 n.4 (CCPA 1975) (“We see no reason why appellants’ representations in their application should not be accepted at face value as admissions that Figs. 1 and 2 may be considered “prior art” for any purpose, including use as evidence of obviousness under § 103. [Citations omitted.] By filing an application containing Figs. 1 and 2, labeled prior art, *ipsissimis verbis*, and statements explanatory thereof, appellants have conceded what is to be considered as prior art in determining obviousness of their improvement.”).



169 USPQ 423, 425 (CCPA 1971) (“As appellant points out, Lauerer’s disclosure is huge, but it undeniably includes at least some of the compounds recited in appellant’s generic claims and is of a class of chemicals to be used for the same purpose as appellant’s additives.”); *In re Lemin*, 332 F.2d 839, 841, 141 USPQ 814, 815-16 (CCPA 1964)(“Generally speaking there is nothing unobvious in choosing ‘some’ among ‘many’ indiscriminately.”)..

Thus, one of ordinary skill in the art routinely following the teachings of Kline would have arrived at the claimed invention encompassed by appealed claim 1, including each and every limitation thereof, without recourse to appellants’ disclosure. *See, e.g., Pro-Mold & Tool Co. v. Great lakes Plastics Inc.*, 75 F.3d 1568, 1573, 37 USPQ 1626, 1629-30 (Fed. Cir. 1996) (“In this case, the reason to combine [the references] arose from the very nature of the subject matter involved, the size of the card intended to be enclosed.”); *In re Gorman*, 933 F.2d 982, 986-87, 18 USPQ2d 1885, 1888-89 (Fed. Cir. 1991) (“The extent to which such suggestion [to select elements of various teachings in order to form the claimed invention] must be explicit in, or may be fairly inferred from, the references, is decided on the facts of each case, in light of the prior art and its relationship to the applicant’s invention.”); *Merck v. Biocraft Labs., supra*; *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988) (“The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that [the claimed process] should be carried out and would have a reasonable likelihood of success viewed in light of the prior art. [Citations omitted] Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant’s disclosure.”); *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980) (“It is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose. *In re Susi*, . . . 440 F.2d 442, 445, 169 USPQ 423, 426 ([CCPA] 1971); *In re Crockett*, . . . 279 F.2d 274, 276-77, 126 USPQ 186, 188 ([CCPA] 1960). As this court explained in *Crockett*, the idea of combining them flows logically from their having been individually taught in the prior art.”); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)(“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed

invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”); *see also In re O’Farrell*, 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1988) (“Obviousness does not require absolute predictability of success. . . . There is always at least a possibility of unexpected results, that would then provide an objective basis for showing the invention, although apparently obvious, was in law nonobvious. [Citations omitted.] For obviousness under § 103, all that is required is a reasonable expectation of success. [Citations omitted.]”).

In any event, Luo acknowledges that “[m]any transition metal catalyst systems based on titanium, vanadium, chromium, molybdenum, palladium and cobalt have been reported in the prior art for the preparation of syndiotactic 1,2-polybutadiene [citations omitted]” (col. 1, line 13, to col. 2, line 8). Luo would have disclosed preparing a syndiotactic 1,2-polybutadiene having different properties than such prior art polymers from 1,3-butadiene using a chromium and magnesium containing catalyst system, such prepared polymers being useful in manufacturing tires (e.g., col. 2, lines 9-28, and col. 6, lines 9-23). Luo further would have disclosed that the process of manufacturing concludes with the inactivation of the catalyst by a terminator and the addition of “[a]n antioxidant such as 2,6-di-tertiary butyl-4-methyl-phenol . . . usually in the range of 0.2% to 1% by weight of the polymer product” (col. 5, lines 54-67, and Example 2).

Thus, *prima facie*, one of ordinary skill in the art routinely following the combined teachings of Kline and Luo would have found therein the reasonable suggestion that any of the (disubstituted aminomethyl) phenol derivatives useful as transition metal catalyst deactivators having antioxidant properties disclosed in Kline can be used alone or in combination with a hindered monohydric phenolic antioxidant, such as 2,6-di-tertiary butyl-4-methyl-phenol or 2,6-di-tertiary hexyl-4-methyl phenol as shown in Kline and Luo, in stabilizing compositions containing stereoregular diene polymers prepared from 1,3 butadiene using a transition metal containing catalyst system, including syndiotactic 1,2-polybutadienes prepared from 1,3-butadiene using a transition metal containing catalyst system as acknowledged to be known in the art and as further disclosed by Luo, in the reasonable expectation of preventing at least “oxidative degradation arising from transition metal residue” as found by the examiner. In this

respect, one of ordinary skill in this art would have reasonably used any of the (disubstituted aminomethyl) phenol derivatives, including the 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol derivatives, in the reasonable expectation of arriving at a stabilized composition as disclosed in Kline. *See generally, Merck v. Biocraft Labs., supra; Susi, supra; Lemin, supra.*

Therefore, one of ordinary skill in the art routinely following the combined teachings of Kline and Luo would have arrived at the claimed invention encompassed by appealed claim 1, including each and every limitation thereof, without recourse to appellants' disclosure. *See, e.g., Pro-Mold, supra; Gorman, supra; Merck v. Biocraft Labs., supra; Dow Chem., supra; Kerkhoven, supra; Keller, supra; see also O'Farrell, supra.*

We now consider the ground of rejection of appealed claim 2 as well as the new ground of rejection of claims 21 and 22 which we enter under 37 CFR § 1.196(b) (2003), which claims further limit the compositions of appealed claim 1. We find that, *prima facie*, one of ordinary skill in this art routinely following the combined teachings of Kline and Luo that we discussed above would have arrived at a workable or optimum range for the amount of any of the (disubstituted aminomethyl) phenol derivatives, including the 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol derivatives, disclosed by Kline to stabilize compositions of diene polymers prepared with transition metal containing catalyst system with respect to at least oxidative degradation caused by the transition metal residue, including compositions containing syndiotactic 1,2-polybutadiene, as acknowledged by Kline, Luo and appellants. This person would not have been limited in determining the workable or optimum range by the amounts disclosed by Kline to be "normal" or illustrated in the Kline Examples. *See In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980) ("[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. [Citations omitted.]"); *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) ("[W]here general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."); *see also In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976) ("[T]he fact that a specific [embodiment] is taught to be

preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.”).

Therefore, with respect to claims 2, 21 and 22, the burden falls upon appellants to establish by effective argument or objective evidence that the claimed composition encompassed by these claims patentably distinguishes over the combined teachings of Kline and Luo. *See, e.g., In re Best*, 562 F.2d 1252, 1255-56, 195 USPQ 430, 433-34 (CCPA 1977)( “Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. *See In re Ludtke*, [441 F.2d 660, 169 USPQ 563 (CCPA 1971)]. Whether the rejection is based on “inherency” under 35 USC 102, on “prima facie obviousness” under 35 USC 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO’s inability to manufacture products or to obtain and compare prior art products. [Footnote and citation omitted.]”); *Aller, supra*; *see also In re Woodruff*, 919 F.2d 1575, 1577-78, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990) (“The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. [Citations omitted.] These cases have consistently held that in such a situation, the applicant must show that the particular range is *critical*, generally by showing that the claimed range achieves unexpected results relative to the prior art range. [Citations omitted.]”).

Accordingly, since a *prima facie* case of obviousness with respect to appealed claims 1, 2, 4 and 5 has been established over the combined teachings of Kline and Luo by the examiner, we have again evaluated all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants’ arguments and the evidence in the declaration of Appellant Luo under 37 CFR § 1.132 (2002)<sup>5</sup> as argued in the brief. *See generally, In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). In view of the *prima facie* case of obviousness under § 103 established over the combined teachings of Kline

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<sup>5</sup> The declaration was filed February 12, 2003 (Paper No. 7).

and Luo with respect to claims 21 and 22, the burden of going forward has shifted to appellants to submit argument and/or evidence in rebuttal in this respect. *See generally, Johnson, supra; Piasecki, supra.*

With respect to appealed claim 1, appellants first argue that Kline and Luo have been combined “against the express teachings of Kline” because “there would have been no reasonable expectation that Kline’s transition metal catalyst deactivators would function successfully as an antioxidant in Luo’s syndiotactic 1,2-polybutadiene” (brief, pages 5-7). Appellants contend in these respects that “Kline teaches that many [(disubstituted aminomethyl) phenol derivatives] cannot be used as antioxidants,” pointing out that “[t]he ‘benefit’ taught by Kline is deactivation of the transition metal catalyst, not stabilization of the polymer from thermal crosslinking” and that “preventing thermal cross-linking or gelation is a different function than deactivating a transition metal catalyst” (*id.*, pages 5-6). Appellants further contend that the reference “does not teach that all polymers containing the residue of a transition metal catalyst will benefit” from the di-substituted aminomethyl phenol derivative transition metal deactivators, and thus does not support the examiner’s contention that syndiotactic 1,2-polybutadienes prepared with “a chromium catalyst” according to the process of Luo would “necessarily” benefit from the use of such compounds (*id.*, pages 5-6).

Appellants next argue that the Luo declaration presents “objective evidence that catalyst deactivators are not equivalent to antioxidants” because it “demonstrates that 2,4,6-tris(dimethylaminomethyl) phenol, one of the preferred [(disubstituted aminomethyl) phenol derivatives] according to the teachings of Kline, is ineffective in preventing syndiotactic 1,2-polybutadiene from thermal crosslinking” (brief, page 7).

Appellants further argue that the examiner improperly concludes that a *prima facie* case of obviousness is established “because the 2,6-dialkyl-4-(dialkylaminomethyl)phenols claimed by Appellants fall within the broad genus of [(disubstituted aminomethyl) phenol derivatives] disclosed by Kline,” contending that under *In re Baird*, 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 Fed. Cir. 1994), “[t]he fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness” (brief, pages 7-8). In this respect, appellants allege a “difference in stabilization properties of Appellant’s claimed

phenols and those of the broad [(disubstituted aminomethyl) phenol derivatives] genus taught by Kline,” pointing to the evidence in the Luo declaration (*id.*, page 8).

Appellants further contend in these respects that there are significant differences between the claimed di-substituted aminomethyl phenol derivatives and the “preferred” (disubstituted aminomethyl) phenol derivatives species of Kline (*id.*, pages 9-10), and that one of ordinary skill in this art would not have been motivated to select the claimed (disubstituted aminomethyl) phenol derivatives (*id.*, pages 10-11). With respect to the first of these two contentions, appellants allege that the claimed phenol derivatives have a disubstituted aminomethyl substituent in the *para* or 4- position while “Kline suggests that preferred results are achieved when” two or three disubstituted aminomethyl substituents occupy one or both *ortho* positions, that is, the 2- and/or 6- positions (*id.*, page 10). Appellants further note that Kline discloses that the (disubstituted aminomethyl) phenol derivatives have similar properties as catalyst deactivators and dissimilar antioxidant properties (*id.*). With respect to the second of these two contentions, appellants allege that “[t]here is no teaching in Kline or in Luo regarding how to choose effective antioxidants from among the genus of [(disubstituted aminomethyl) phenol derivatives]” disclosed by Kline (*id.*, page 11).

Appellants finally argue that the examiner has relied on hindsight on the basis that “[t]he only way that the Examiner could have arrived at the conclusion that [(disubstituted aminomethyl) phenol derivatives] are effective antioxidants is through Appellants’ own disclosure” (*id.*).

The examiner responds to appellants arguments with respect to appealed claim 1, that Kline teaches the use of (disubstituted aminomethyl) phenol derivatives disclosed therein as deactivators for metallic catalyst residues that cause oxidative degradation in diene polymers, and that “[t]he syndiotactic 1,2-polybutadiene of Luo is a stereoregular diene polymer prepared with a transition metal catalyst, and therefore . . . prone to metal residue contamination upon completion of polymerization” (answer, page 5). The examiner concludes from these findings that one of ordinary skill in the art would have been motivated to use the di-substituted aminomethyl phenol derivatives of Kline in the syndiotactic 1,2-polybutadiene of Luo “to stabilize the syndiotactic 1,2-polybutadiene against oxidative degeneration due to metal residues,”

which conclusion “flows naturally from the combined teachings” of the references (*id.*, pages 5-6).

Thus, the examiner argues that “[i]t is not clear . . . how Kline discourages the skilled artisan from using [Kline’s] own compounds” as appellants contend, noting that “Kline does teach away from . . . using [(disubstituted aminomethyl) phenol derivatives] for anionically polymerized polybutadiene, which uses lithium catalyst” (answer, page 6). The examiner further points out that Kline’s (disubstituted aminomethyl) phenol derivatives can be used with syndiotactic 1,2-polybutadiene “because Kline teaches that his compounds are useful in stereoregular polymers,” citing the examples of stereoregular diene polymers at col. 3, lines 3, 4 and 11 (*id.*, page 6, text and n.2).

The examiner further submits that there is a difference between the properties of catalyst deactivation and antioxidation, and that these properties are not “equated functionally” in the rejection (*id.*, page 7). The examiner argues that the (disubstituted aminomethyl) phenol derivatives do not have to be good antioxidants to combine Kline and Luo because the motivation to combine does not have to be identical to the reason that appellants have used the Kline compounds (*id.*, pages 7-8).

The examiner points out that 2,6-di-*t*-butyl-4-dimethylaminomethylphenol and 2,6-di-*t*-butyl-4-piperidinomethylphenol disclosed in Kline fall into the structural formula depicted in appealed claim 1, and argues that one of ordinary skill “does not need to infer a seemingly unobvious embodiment from some generic skeletal structure,” and thus, the selection of such compounds from a list that “is not a lengthy one” by this person would have been obvious (*id.*, page 8). The examiner submits that while these two compounds are not disclosed as preferred by Kline, the same would have been considered by one of ordinary skill in the art, citing *Lamberti, supra* (answer, page 8).

The examiner further argues that the combined teachings of Kline and Luo would have provided one of ordinary skill in the art with a reasonable expectation of success in using the compounds of Kline to prevent oxidative degradation in syndiotactic 1,2-polybutadiene by deactivating catalyst residue and would use the Kline compounds in compositions with

syndiotactic 1,2-polybutadiene of Luo because the Kline compounds confer "antioxidative effects, resulting in a 'stabilized' composition" (*id.*, pages 8-9).

We agree with the examiner's positions. Appellants' principal contention is that one of ordinary skill in this art would not have selected the 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol derivatives disclosed by Kline as transition metal catalyst deactivators having antioxidant properties for solely the antioxidant properties in combining the same with the stereoregular diene polymer syndiotactic 1,2-polybutadiene in order to stabilize the resulting composition from oxidation, pointing to the difference in result with respect to thermal crosslinking between 2,6-di-*t*-butyl-4-dimethylaminomethylphenol and 2,4,6-tris(dimethylaminomethyl) phenol in the oxidative degradation test in the Luo declaration. Appellants' arguments must, of course, be considered in light of the interpretation we have made of appealed claim 1, wherein the claimed 2,6-di(organic group)-4-(di(organic group) aminomethyl) phenol derivatives depicted by structural formula are not limited to the 2,6-dialkyl-4-(dialkylamino or N-heterocyclic)-phenol derivatives as argued by appellants, and there is no limitation with respect to the extent to which the "organic group" substituted phenolic derivatives must possess the specified antioxidant property, the amount of such derivative that must be present, the manner in which the composition must be stabilized, or on the presence of additional stabilizers (*see above* pp. 3-5).

We find that considered for what it shows, the comparison in the Luo declaration of two *claimed* compounds (*see above* p. 7) with respect to stabilizing a syndiotactic 1,2-polybutadiene prepared with an iron containing metal catalyst, without indication of the extent of deactivation of the catalytic iron metal or the amount thereof in the composition, demonstrates that under the oxidizing conditions stated, the 2,6-di-*t*-butyl-4-dimethylaminomethylphenol stabilized the composition to a significantly greater extent than 2,4,6-tris(dimethylaminomethyl) phenol, both compounds falling within the teachings of Kline. This result is not unexpected from the disclosure of Kline who not only teaches that "many" of the (disubstituted aminomethyl) phenol derivatives disclosed therein as metal deactivators "are not very effective as antioxidants" (col. 3, lines 46-48), but points out that well known hindered monohydric phenolic antioxidants have, *inter alia*, a tertiary alkyl group "in at least one of the positions ortho to the hydroxy group"



(col. 3, lines 49-54). Indeed, the difference between the two claimed compounds compared by Luo is in the substituents in the *ortho* position, with the compound having tertiary butyl substituents in both *ortho* positions being more effective.

Thus, we determine that one of ordinary skill in this art would have recognized from Kline that any of the (disubstituted aminomethyl) phenol derivatives disclosed therein can be used to deactivate transition metal residues remaining from the catalysts employed in preparing the stereoregular diene polymer, thus stabilizing the resulting composition from oxidative degradation caused by such residues, and where the extent of the oxidative stabilization with a particular (disubstituted aminomethyl) phenol derivative was less than required, additional antioxidant phenols can be added to the composition. Therefore, because the stereoregular diene polymer syndiotactic 1,2-polybutadiene was well known in the art to be prepared from transition metal containing polymers as acknowledged by appellants and Luo and further disclosed by Luo, one of ordinary skill in this art would have been motivated by Kline to include any of the (disubstituted aminomethyl) phenol derivatives in the compositions even though the mechanism for stabilizing the composition against oxidation by deactivating the transition metal residues disclosed in the reference is not the mechanism for stabilizing the composition against oxidation disclosed by appellants. Indeed, as the examiner points out, it is sufficient that the reference would have suggested the use of the (disubstituted aminomethyl) phenol derivatives to one of ordinary skill in the art. *See In re Kronig*, 539 F.2d 1300, 1304, 190 USPQ 425, 428, (CCPA 1976) (“[I]t is sufficient here that [the reference] clearly suggests doing what appellants have done.”). In this case, the (disubstituted aminomethyl) phenol derivatives can in fact provide both the metal deactivation and antioxidant mechanisms as taught by Kline.

Furthermore, appellants’ argument that Kline would not have taught or suggested the (disubstituted aminomethyl) phenol derivatives of appealed claim 1 to one of ordinary skill in the art because such derivatives are not disclosed to be preferred embodiments is clearly contrary to applicable authority. *See generally, Merck v. Biocraft*, 874 F.2d at 807, 10 USPQ2d at 1846 (quoting *Lamberti, supra*). Indeed, it would have been readily apparent to one of ordinary skill in this art that the claimed (disubstituted aminomethyl) phenol derivatives would function in the same or similar manner as the other (disubstituted aminomethyl) phenol derivatives disclosed by

Kline for the purposes for which they are used in the reference. Indeed, the structural formula depicted in appealed claim 1 encompasses the 2,6-disubstituted-4-(dialkylamino or N-heterocyclic)-phenol derivatives disclosed by Kline. See *Merck v. Biocraft, supra*; *Susi, supra*; *Lemin, supra*; cf. *In re Sivaramakrishnan*, 673 F.2d 1383, 213 USPQ 441 (CCPA 1982) (“[T]he fact remains that one of ordinary skill informed by the teachings of [the reference] would not have had to choose judiciously from a genus of possible combinations of resin and salt to obtain the very subject matter to which appellant’s composition per se claims are directed.”). Thus, the facts here are not those of *In re Baird*, cited by appellants, wherein our reviewing court found that the cited reference disclosed an estimated “100 million different diphenols, only one of which is bisphenol A.” 16 F.3d at 382, 29 USPQ2d at 1552.

With respect to appealed claim 1, appellants also rely on “objective evidence . . . [illustrating] the unexpected discovery of useful antioxidants to prevent thermal crosslinking of syndiotactic 1,2-polybutadiene,” pointing to a statement to this effect at page 4, lines 20-25, in the specification, and the specification “comparative examples at pages 14-15” (brief, page 12). Appellants submit that “[t]hese examples show that nine substances, commonly used as polymer stabilizers, do not work effectively for syndiotactic 1,2-polybutadiene,” and point to the statement at page 2, lines 10-13, in the specification with respect to “[t]he unpredictability of the art of selecting a useful antioxidant” (*id.*). Appellants contend that the Luo declaration presents comparative experiments that “illustrate that one of the compounds most preferred by Kline for catalyst deactivation in stereoregular polymers does not stabilize syndiotactic 1,2-polybutadiene from thermal crosslinking” (*id.*).

With respect to the evidence in the Luo declaration, the examiner finds that 2,6-di-*t*-butyl-4-dimethylaminomethylphenol prevented crosslinking in syndiotactic 1,2-polybutadiene where 2,4,6-tris(dimethylaminomethyl) phenol did not “under one specific oxidizing condition (during compression at 210 °C)” (answer, page 9). The examiner finds that this evidence supports “the obviousness of selecting Kline’s 2,6-di-*t*-butyl-4-dimethylaminomethylphenol as a stabilizing compound (or antioxidant or crosslinking retardant),” whereas “the rejection . . . does not concern use of 2,4,6-*tris*(dimethylaminomethyl) phenol” (*id.*, pages 9-10).

We found above that the Luo declaration compares two *claimed* compounds with respect to stabilizing a syndiotactic 1,2-polybutadiene prepared with an *iron* containing catalyst, noting that there was no indication of the extent of deactivation of the catalytic *iron* metal or the amount thereof in the composition, and that the 2,6-di-*t*-butyl-4-dimethylaminomethylphenol stabilized the composition to a significantly greater extent than 2,4,6-tris(dimethylaminomethyl) phenol under the oxidizing conditions stated, both phenol derivatives falling within Kline. In the comparison in the specification Example and Comparative Example (pages 13-15), the same *iron* containing catalyst is used to prepare the same syndiotactic 1,2-polybutadiene which is combined with 2,6-di-*t*-butyl-4-dimethylaminomethylphenol in the Example, and with nine (9) other compounds in the Comparative Example, *none* of which falls within the teachings of Kline. The reported result with respect to the effect of 2,6-di-*t*-butyl-4-dimethylaminomethylphenol and the nine other compounds on the oxidation of the compositions under the same conditions as in the Luo declaration, is the same as the result reported in the Luo declaration.

It is well settled that the burden of establishing the significance of data in the record with respect to unexpected results rests with appellants, which burden is not carried by mere arguments of counsel. *See generally, In re Geisler*, 116 F.3d 1465, 1470, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997); *In re Merck*, 800 F.2d 1091, 1099, 231 USPQ 375, 381 (Fed. Cir. 1986); *In re Longi*, 759 F.2d 887, 897, 225 USPQ 645, 651-52 (Fed. Cir. 1985); *In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972); *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); *In re D'Ancicco*, 439 F.2d 1244, 1248, 169 USPQ 303, 306 (1971). Appellants have not carried this burden on this record.

On this record, we remain of the view that the result demonstrated in the Luo declaration between the two *claimed* compounds compared therein is not unexpected in light of the teachings of Kline (*see above* pp. 16-17). We find no disclosure in the record or in appellants' arguments in the brief which establishes the practical significance of the results reported in the specification Example and Comparative Example based on nine antioxidants, apparently randomly selected. This is so for 2,6-di-*t*-butyl-4-methylphenol, one of the nine, even though this compound is disclosed as a hindered monohydric phenolic antioxidant useful with (disubstituted aminomethyl) phenol derivatives in Kline and used by Luo in syndiotactic 1,2-polybutadiene

compositions prepared with the novel *chromium* containing catalysts disclosed therein (Luo, e.g., col. 2, lines 24-28, col. 5, lines 63-67, and col. 6, lines 59-61 and 64-65).

Accordingly, on this record, we find that the comparison in the Luo declaration and the comparison provided in the specification Examples do not constitute direct or indirect comparisons between the claimed invention and the closest prior art that reflect the thrust of the examiner's rejection, which is based on certain but not all of the phenol derivatives disclosed in Kline that are encompassed by appealed claim 1 and the use thereof in stabilizing compositions of the known stereoregular diene polymer syndiotactic 1,2-polybutadiene prepared with transition metal containing catalysts. The comparison based on 2,6-di-*t*-butyl-4-methylphenol does not provide such a comparison in this instance since the claimed composition of specification Example 1 does not contain this antioxidant as permitted by appealed claim 1 as we interpreted this claim above. *See generally, In re Baxter Travenol Labs.*, 952 F.2d 388, 392, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991) (“[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared to the closest prior art. [Citation omitted.]”); *In re Burckel*, 592 F.2d 1175, 1179, 201 USPQ 67, 71 (CCPA 1979) (the claimed subject matter must be compared with the closest prior art in a manner which addresses the thrust of the rejection); *In re Blondel*, 499 F.2d 1311, 1317, 182 USPQ 294, 298 (CCPA 1974) (the indirect evidence provided a reliable indication of the performance of the closest claimed and prior art compounds).

Moreover, even if the comparisons in the Luo declaration and the specification constitutes evidence of unexpected results between a claimed composition encompassed by appealed claim 1 and a composition of the combination of Kline and Luo, such evidence is not commensurate in scope with the myriads of compositions encompassed by appealed claim 1 and taught by the combined teachings of Kline and Luo. We point out in this respect, the other specific phenol derivatives disclosed by Kline that are encompassed by claim 1 in addition to the two derivatives compared in the Luo declaration; the compositions encompassed by appealed claim 1 and taught in Kline which contain the (disubstituted aminomethyl) phenol derivatives and additional antioxidants; and the use of catalysts containing other catalytic transition metals, such as cobalt and chromium, including the chromium containing catalyst disclosed by Luo, in

the preparation of the known stereoregular diene polymer syndiotactic 1,2-polybutadiene encompassed by appealed claim 1 to which the (disubstituted aminomethyl) phenol derivatives, with and without the additional antioxidants, as taught by Kline would be added by one of ordinary skill in this art. Indeed, there is no evidence that the same result established by the comparisons in the Luo declaration and the specification based on the same claimed compounds and no other Kline compounds in composition with syndiotactic 1,2-polybutadiene prepared with an iron containing catalyst would be exhibited by the myriads of claimed compositions so encompassed by appealed claim 1 vis-à-vis those of the combined teachings of Kline and Luo. *See In re Kulling*, 897 F.2d 1147, 1149-50, 14 USPQ2d 1056, 1058 (Fed. Cir. 1990); *In re Clemens*, 622 F.2d 1029, 1035-36, 206 USPQ 289, 295-96 (CCPA 1980); *In re Greenfield*, 571 F.2d 1185, 1189, 197 USPQ 227, 230 (CCPA 1978); *Lindner, supra*.

Turning now to appealed claims 2, 21 and 22, appellants argue with respect to the ground of rejection advanced on appeal, that these claims specify respective amounts of (disubstituted aminomethyl) phenol derivatives encompassed by the structural formula in appealed claim 1, on which the claims considered here depend, per 100 parts of syndiotactic 1,2-polybutadiene, while Kline does not teach that the amount of such compounds is related to the amount of polymer. In this respect, appellants point to the teaching at col. 4, lines 23-27, where the amount of said compounds “will vary depending on the amount of catalyst used in preparing the polymer” and that “normally from one mole to five moles per mole of transition metal in the catalyst” is used (brief, pages 13-14).

Appellants further allege that a comparison based on specification Example 1, wherein “0.05 mmoles of iron compound” is used in the catalyst ingredients (brief, page 14; *see also* specification page 14, lines 4-6), shows the following:

This [0.05 mmoles of iron compound] corresponds to about 0.1 mmoles per 100 parts of polymer. According to the teachings of Kline, this would suggest the use of from about 0.1 to about 0.5 mmoles of [(disubstituted aminomethyl) phenol derivative] compound per 100 parts polymer, or in other words, from about 0.02g to about 0.1 g of 2,6-di-t-butyl-4-dimethylaminomethylphenol. [Footnote omitted.] In contrast, 1.5 g of 2,6-di-t-butyl-4-dimethylaminomethylphenol is used in Example 1 (3.0 g per 100 g polymer), which is an amount significantly distinct from that taught by Kline. [Brief, page 14.]

The examiner finds that because “[t]he polymerization examples tabulated in Luo are similar to that of [specification] Example 1,” appellants’ “example is representative of the prior art,” stating that appellants’

calculations are correct . . . that for a majority of examples, Kline’s prescribed amount of 1-5 mmole 2,6-di-*t*-.butyl-4-dimethylaminomethylphenol in the amount of recovered polybutadiene equates to a weight ratio that lies outside the claimed ratio of 0.1-10 parts by weight per 100 parts by weight of polymer (see present claim 2)” (answer, page 10). [Answer, page 10.]

However, the examiner further finds that

Example 17 of Luo shows a case where the polymer yield is only 21%, and this is equivalent to 15.8 g of polymer. For 0.075 mmole of catalyst, one may use 0.075 mmole of 2,6-di-*t*-.butyl-4-dimethylaminomethylphenol. This composition would contain 0.12 parts of 2,6-di-*t*-.butyl-4-dimethylaminomethylphenol per 100 parts of polymer, and such composition would meet the limitation set forth in present claim 2. if one were to use 0.075 mmole of 2,6-di-*t*-.butyl-4-piperidinomethylphenol instead, the composition would contain 0.14 parts by weight of compound to 100 parts of polymer. Therefore, the numerical range of 0.1-10 parts by weight, recited in present claim 2, remains obvious in view of the teachings of the prior art.

Appellants have addressed the issue of whether a workable or optimum range for the amount of (disubstituted aminomethyl) phenol derivatives in a stereoregular diene polymer composition that one of ordinary skill in this art would have determined based on the teachings of Kline would result in an amount of phenol derivative in parts by weight of derivative to 100 parts by weight of polymer product which falls within the ranges specified in the latter manner in appealed claim 2 and claims 21 and 22. In the passage from Kline cited by appellants, it is disclosed that the amount of derivative will “vary” depending on the amount of catalyst, with the amount “normally” being in the range of one to five moles to one mole of transition metal in the catalyst.

The examiner does not dispute appellants’ calculations, which show that in specification Example 1, the normal one to five mole equivalent range in Kline results in the range of about 0.02 to 0.1 parts of 2,6-di-*t*-.butyl-4-dimethylaminomethylphenol per 100 parts of polymer product. However, the examiner provides a calculation based on Luo Example 17 showing that if 0.075 mmole of 2,6-di-*t*-.butyl-4-dimethylaminomethylphenol is used per 0.075 mmole of catalyst, the equivalent is 0.12 parts of phenol derivative per 100 parts of polymer product, and

where 0.075 mmole of 2,6-di-*t*-butyl-4-piperidinomethylphenol is used, the equivalent is 0.14 parts of phenol derivative per 100 parts of polymer product.

We find it apparent that in terms of the “normal” one to five mole equivalent range in Kline, when the 1 mole of phenolic derivative to one mole of catalyst equivalent in the examiner’s calculation is extrapolated to 5 moles of phenolic derivative to one mole of catalyst equivalent, the amounts of the two phenolic derivatives used would be 0.60 and 0.70 parts per 100 parts of polymer product, respectively. These values fall within the range of each of claims 2, 21 and 22.

On this record, even if one of ordinary skill in this art would find the teachings of Kline to be limited to the range of phenolic derivative used based on the amount of transition metal in the catalyst disclosed to be “normally used,” which they are not, *Lamberti, supra*, the calculations presented by appellants and the examiner demonstrate that within the range of transition metal containing catalysts known to be useful to prepare stereoregular diene polymers including syndiotactic 1,2-polybutadiene as acknowledged by Kline, Luo and appellants and as disclosed by Luo, the calculation advanced by appellants on a single example cannot be said to be representative of the range of the amounts of the phenolic derivatives of Kline that can be employed by one of ordinary skill in this art, or to otherwise establish the criticality of the ranges based on parts by weight with respect to the polymer product specified in claims 2, 21 and 22. *See Geisler, supra; Woodruff, supra; Boesch, supra; Aller, supra.*

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Kline and Luo with appellants’ countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1, 2, 4 and 5 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

With respect to claims 21 and 22, having reconsidered the evidence of obviousness in the combined teachings of Kline and Luo with appellants’ arguments and evidence of nonobviousness which pertain to the new ground of rejection that we have explained above, we remain of the opinion that the claimed compositions encompassed by claims 21 and 22 are *prima facie* obvious over the applied prior art. Thus, the burden of going forward with respect

to this ground of rejection remains with appellants. *See generally, Johnson, supra; Piasecki, supra.*

The examiner's decision is affirmed.

In addition to affirming the examiner's rejection of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b) (2003). 37 CFR § 1.196(b) provides, "A new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) (2003) provides:

(b) Appellant may file a single request for rehearing within two months from the date of the original decision . . . .

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should appellants elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.



No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

*AFFIRMED*

*37 CFR § 1.196(b)*

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